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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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09/912,706

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Zhimin Shi

SHI01010

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Jie Sha

Attorney-at-law

195 North Harbor Drive, Suite 3504

Chicago, IL 60601

EXAMINER

WHIPKEY, JASON T

ART UNIT

PAPER NUMBER

2612

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Please find below and/or attached an Office communication concerning this application or proceeding.

## Office Action Summary

Application No.

09/912,706

Applicant(s)

SHI, ZHIMIN

Examiner

Jason T. Whipkey

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --  
Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

### Status

- 1) ☐ Responsive to communication(s) filed on \_\_\_\_.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

### Disposition of Claims

- 4) ☒ Claim(s) 1-10 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-10 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_ are subject to restriction and/or election requirement.

### Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 25 July 2001 is/are: a) ☐ accepted or b) ☒ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

### Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some \* c) ☐ None of:
- ☐ Certified copies of the priority documents have been received.
  - ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_.
  - ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- \* See the attached detailed Office action for a list of the certified copies not received.

### Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)  
Paper No(s)/Mail Date \_\_\_\_.
- 4) ☐ Interview Summary (PTO-413)  
Paper No(s)/Mail Date \_\_\_\_.
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: \_\_\_\_.

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## DETAILED ACTION

### *Drawings*

1. The drawings are objected to as failing to comply with 37 CFR 1.84(p)(4) because reference characters 6 and 16 have been used in Figure 1 to indicate the same part. Reference characters 4 and 10 in Figure 1 have also been used to indicate the same part. Reference characters 2 and 8 in Figure 1 have also been used to indicate the same part. Reference characters 3 and 9 in Figure 1 have also been used to indicate the same part. Reference characters 3 and 7 in Figure 1 have also been used to indicate the same part.

Corrected drawing sheets in compliance with 37 CFR 1.121(d) are required in reply to the Office action to avoid abandonment of the application. Any amended replacement drawing sheet should include all of the figures appearing on the immediate prior version of the sheet, even if only one figure is being amended. The replacement sheet should be labeled "Replacement Sheet" in the page header (as per 37 CFR 1.84(c)) so as not to obstruct any portion of the drawing figures. If the changes are not accepted by the examiner, Applicant will be notified and informed of any required corrective action in the next Office action. The objection to the drawings will not be held in abeyance.

2. The drawings are objected to as failing to comply with 37 CFR 1.84(p)(4) because reference characters 1, 4, 6, 8, and 9 have each been used to designate to designate a plurality of parts in Figure 1. Corrected drawing sheets in compliance with 37 CFR 1.121(d) are required in reply to the Office action to avoid abandonment of the application. Any amended replacement

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drawing sheet should include all of the figures appearing on the immediate prior version of the sheet, even if only one figure is being amended. The replacement sheet should be labeled "Replacement Sheet" in the page header (as per 37 CFR 1.84(c)) so as not to obstruct any portion of the drawing figures. If the changes are not accepted by the examiner, Applicant will be notified and informed of any required corrective action in the next Office action. The objection to the drawings will not be held in abeyance.

3. The drawings are objected to as failing to comply with 37 CFR 1.84(p)(5) because Figure 1 includes reference character "18" not mentioned in the description. Corrected drawing sheets in compliance with 37 CFR 1.121(d), or amendment to the specification to add the reference character in the description in compliance with 37 CFR 1.121(b) are required in reply to the Office action to avoid abandonment of the application. Any amended replacement drawing sheet should include all of the figures appearing on the immediate prior version of the sheet, even if only one figure is being amended. The replacement sheet should be labeled "Replacement Sheet" in the page header (as per 37 CFR 1.84(c)) so as not to obstruct any portion of the drawing figures. If the changes are not accepted by the examiner, Applicant will be notified and informed of any required corrective action in the next Office action. The objection to the drawings will not be held in abeyance.

4. The drawings are objected to as failing to comply with 37 CFR 1.84(p)(5) because they do not include the reference sign "12" mentioned on page 6 of the description. Corrected drawing sheets in compliance with 37 CFR 1.121(d) are required in reply to the Office action to

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avoid abandonment of the application. Any amended replacement drawing sheet should include all of the figures appearing on the immediate prior version of the sheet, even if only one figure is being amended. The replacement sheet should be labeled "Replacement Sheet" in the page header (as per 37 CFR 1.84(c)) so as not to obstruct any portion of the drawing figures. If the changes are not accepted by the examiner, Applicant will be notified and informed of any required corrective action in the next Office action. The objection to the drawings will not be held in abeyance.

***Claim Rejections - 35 USC § 102***

5. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

(e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

6. Claims 1-3, 6, and 7 are rejected under 35 U.S.C. 102(e) as being anticipated by Tani (U.S. Patent No. 6,721,007).

Regarding **claim 1**, Tani discloses:

A system of capturing and processing a digital image with distance information, comprising means for receiving reflective and deflective light beams from an object

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(CCD 28, shown in Figure 2), means for sensing the received light beams to generate digital images with distance information (system control circuit 35 operates CCD drive circuit 30 and image signal process circuit 33 to generate images with distance information; see column 3, lines 55-58, and column 4, lines 13-20), means for storing the digital images (traditional visual image data is stored in image memory 34 in addition to distance information; see column 3, lines 54-55, and column 7, lines 8-11), and a central processing unit (image processing circuit 33) for analyzing and processing the digital image of distance information by using the distance information as a depth channel (step 123; see column 9, lines 33-34).

Regarding **claim 2**, Tani discloses:

the means for receiving the light beams includes at least a lens (11) and a CCD array unit (28; see column 3, lines 41-42), and the lens is attached to a housing of the system (see Figure 1).

Regarding **claim 3**, Tani discloses:

the storage means (memory 34) and the CPU (processor 33) are mounted within the housing (housing 10, as shown in Figure 2).

Regarding **claim 6**, Tani discloses:

A method of capturing and processing a digital image with distance information, comprising the steps of receiving reflective and deflective light beams from an object (via CCD 28, shown in Figure 2), detecting the light beams to generate digital images with distance information (system control circuit 35 operates CCD drive circuit 30 and image signal process circuit 33 to generate images with distance information; see column 3,

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lines 55-58, and column 4, lines 13-20), converting the distance information into depth channel (the distance information output from CCD 28 forms a “third dimension” of the image data; see column 7, lines 23-26), storing the digital image with said depth information for future processing (the distance information is stored in image memory 34; see column 7, lines 8-11), and analyzing and processing the digital image with the desired depth channel (calculations are performed using the stored distance information; see column 9, lines 33-35).

Regarding **claim 7**, Tani discloses:

said step of processing includes adjusting said depth channel at a desired pixel of said digital image (the measurement accuracy of pixels is corrected; see column 9, lines 56-60).

7. Claims 1, 2, 4, 6, 8, and 9 are rejected under 35 U.S.C. 102(b) as being anticipated by Cambier (U.S. Patent No. 5,159,361).

Regarding **claim 1**, Cambier discloses:

A system of capturing and processing a digital image with distance information, comprising means for receiving reflective and deflective light beams from an object (video camera 32, shown in Figure 3; see column 10, lines 62-63), means for sensing the received light beams to generate digital images with distance information (an image of projected grid pattern 308 in Figure 16 captured by a computer via video camera 32 is digitized to produce a vector for each grid coordinate; see column 31, lines 18-20, and column 40, lines 29-31), means for storing the digital images (see column 10, lines 67-

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68), and a central processing unit (image processor unit 44; see column 10, line 68, through column 11, line 2) for analyzing and processing the digital image of distance information by using the distance information as a depth channel (the vectors are compared with the original grid to produce elevation data, which is processed to produce a map; see column 40, lines 61-64, and column 43, lines 7-10).

Regarding **claim 2**, Cambier discloses:

the means for receiving the light beams includes at least a lens (12; column 9, lines 29-31) and a CCD array unit (unlabeled; see column 27, lines 64-65), and the lens is attached to a housing of the system (see Figure 3).

Regarding **claim 4**, Cambier discloses:

a grid beam light unit (a grid is projected using flash tube unit 34; see column 10, lines 58-60) being provided as an internal unit inside the housing (see Figure 3).

Regarding **claim 6**, Cambier discloses:

A method of capturing and processing a digital image with distance information, comprising the steps of receiving reflective and deflective light beams from an object (via video camera 32, shown in Figure 3; see column 10, lines 62-63), detecting the light beams to generate digital images with distance information (an image of projected grid pattern 308 in Figure 16 captured by a computer via video camera 32 is digitized to produce a vector for each grid coordinate; see column 31, lines 18-20, and column 40, lines 29-31), converting the distance information into depth channel (the vectors are compared with the original grid to produce elevation data; see column 40, lines 61-64), storing the digital image with said depth information for future processing (elevation data



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can be stored for later analysis; see column 42, line 61, through column 43, line 4), and analyzing and processing the digital image with the desired depth channel (elevation data is processed to produce a map; see column 43, lines 7-10).

Regarding **claim 8**, Cambier discloses:

a step of transmitting grid light beams toward the object, including horizontal and vertical beam light (as shown in Figure 14, grid 300 with intersecting horizontal and perpendicular lines is projected on the subject; see column 20, lines 66-68) to generate a digital image of a group of pixels carrying depth information (the image of the intersecting lines of the grid is captured and processed to produce a vector for each grid coordinate; see column 21, lines 19-22 and column 40, lines 29-31).

Regarding **claim 9**, Cambier discloses:

the step of analyzing the distance information comprises the analysis of received grid light beams so as to determine depth information of the digital image (the vectors are compared with the original grid to produce elevation data; see column 40, lines 61-64).

8. Claim 6 is rejected under 35 U.S.C. 102(e) as being anticipated by Sato (U.S. Patent No. 6,765,618).

Regarding **claim 6**, Sato discloses:

A method of capturing and processing a digital image with distance information, comprising the steps of receiving reflective and deflective light beams from an object (light is received by photographing lens 11, as shown in Figure 11), detecting the light beams to generate digital images with distance information (CCD 38 senses a distance

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using each photodiode; see column 7, lines 38-41), converting the distance information into depth channel (data indicating the distance is output; see column 7, lines 38-40), storing the digital image with said depth information for future processing (the data is stored in three-dimension information memory 48), and analyzing and processing the digital image with the desired depth channel (the digital data is processed to produce a histogram and calculate "a distance from the camera to the desired subject image; see column 9, lines 55-59).

***Claim Rejections - 35 USC § 103***

9. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

10. Claim 5 is rejected under 35 U.S.C. 103(a) as being unpatentable over Cambier in view of Girod (U.S. Patent No. 5,003,166).

Claim 5 may be treated like claim 2. However, Cambier is silent with regard to having the grid beam generated by a unit external to the housing.

Girod discloses, as shown in Figure 1A, a system that maps an object 12 captured by camera 24. Rectilinear grid 16 projected by source 10 causes a pattern 20 to be placed on object 12 (column 6, line 61, through column 7, line 5). As stated in column 3, line 64, through column

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4, line 1, an advantage to having the projector separate from the camera housing is that, when combined with a beam splitting mirror, a parallax error caused by a difference in optical axes between the camera and projector can be eliminated, resulting in a more accurate distance map. For this reason, it would have been obvious at the time of invention to have Cambier's system include a projector separate from the camera housing.

11. Claim 10 is rejected under 35 U.S.C. 103(a) as being unpatentable over Sato.

Claim 10 may be treated like claim 6. Additionally, Sato teaches that distance data is stored in three-dimensional information memory 48, while traditional image data is stored in image memory 71 (column 9, lines 33-36). However, Sato is silent with regard to red, green, and blue image data specifically being stored in image memory 71.

Official Notice is taken that digital cameras often capture red, green, and blue images of a subject. An advantage to doing so is that these three colors are also used in computer systems to represent color, thus making requiring fewer computations to process than other color schemes. For this reason, it would have been obvious to one of ordinary skill in the art to have Sato's camera store red, green, and blue image data.

### ***Conclusion***

12. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

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13. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Jason T. Whipkey, whose telephone number is (703) 305-1819. The examiner can normally be reached Monday through Friday from 8:30 A.M. to 6:00 P.M. eastern daylight time, alternating Fridays off.


If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Wendy R. Garber, can be reached on (703) 305-4929. The fax phone number for the organization where this application is assigned is (703) 872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

JTW

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September 29, 2004

  
WENDY R. GARBER  
SUPERVISORY PATENT EXAMINER  
TECHNOLOGY CENTER 2600